

# Space Weather in Operation

Completed Technology Project (2014 - 2015)



## Project Introduction

The "Space Weather in Operations" effort will provide on-demand and near-real time space weather event information to the Data Access Toolkit (DAT), which is the next generation trending system for NASA missions. The types of space weather events that will be identified and made available in the system include solar flares, coronal mass ejections, and solar energetic particles.

It is imperative that Mission Operations Teams (MOTs) have access to information that is pertinent to the safety of their satellites. Space environment information, particularly phenomena that is elevated to the level of "event" status, is information that should be readily available to all MOTs - allowing them to be better equipped to protect NASA assets in space.

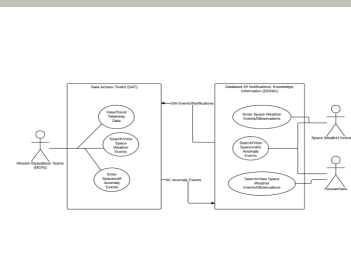
This activity will leverage existing GSFC capabilities and data sets, with space weather event information primarily coming from the Database Of Notifications, Knowledge, Information (DONKI) system. DONKI currently captures all space weather events that are observed and analyzed by the forecasters at the Space Weather Research Center (SWRC) at GSFC. Once a standardized interface and pipeline has been clearly defined and implemented, the DAT trending system can request and ingest SW event information from DONKI in near real-time - subsequently making such information readily available to the MOT. The DONKI system would also be able to request and ingest potential spacecraft anomaly events, or general spacecraft events of interest, from the DAT trending system. These spacecraft events would help the CCMC/SWRC team correlate and investigate the effects of space weather on various spacecraft under specific circumstances.

## Anticipated Benefits

As part of the Community Coordinated Modeling Center (CCMC) within the GSFC Heliophysics Science Division, the Space Weather Research Center (SWRC) is tasked to provide space weather services to NASA's robotic missions. This proposed effort directly addresses the needs of current NASA missions in dealing with the potential negative effects of space weather on our spacecraft in near real-time.

Knowledge gained from this proposed effort will directly benefit all current and future NASA missions. This effort will enable us to correlate space environment information with spacecraft anomaly data, therefore advancing our understanding of the effects of space weather on spacecraft and specific technology systems. Investigating and eventually understanding these effects are essential for NASA since one of our nation's next steps in space is to be able to send humans to Mars by 2030.

Other trending systems used and built by the commercial space industry can benefit from using a common interface to obtain space weather events information automatically.



Use Case Diagram

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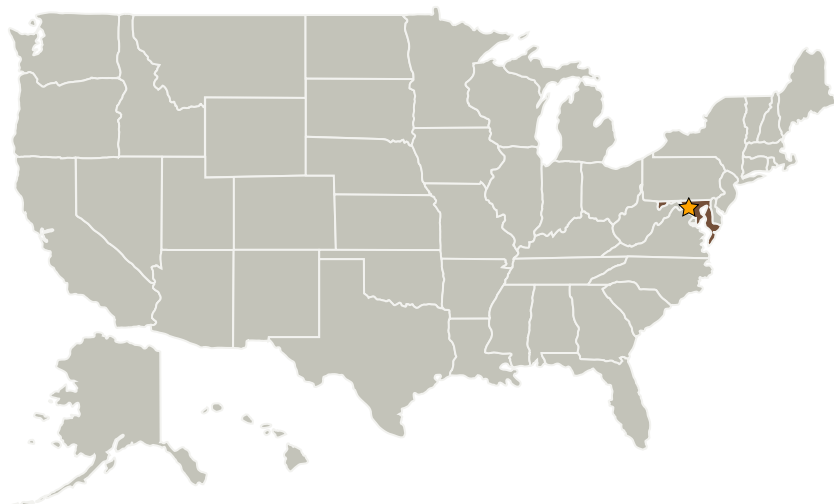
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Other government agencies like NOAA and DoD can benefit from using a common interface to obtain space weather events information autonomously.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Goddard Space Flight Center (GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

## Primary U.S. Work Locations

Maryland

## Organizational Responsibility

**Responsible Mission Directorate:**

Mission Support Directorate (MSD)

**Lead Center / Facility:**

Goddard Space Flight Center (GSFC)

**Responsible Program:**

Center Independent Research &amp; Development: GSFC IRAD

## Project Management

**Program Manager:**

Peter M Hughes

**Project Manager:**

Jacqueline J Le Moigne-stewart

**Principal Investigator:**

Chiu P Wiegand

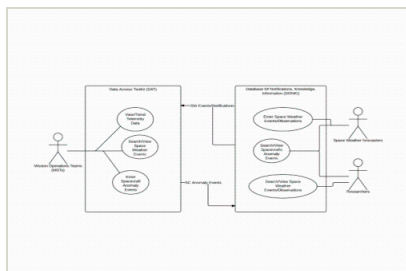
**Co-Investigators:**Maria M Kuznetsova  
Robert E Wiegand

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## Images



### Use Case

Use Case Diagram

(<https://techport.nasa.gov/image/4187>)

## Links

GSC-16878-1

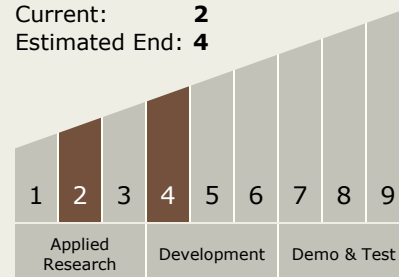
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### Project Website:

<http://sciences.gsfc.nasa.gov/sed/>

## Technology Maturity (TRL)

Start: 2  
Current: 2  
Estimated End: 4



## Technology Areas

### Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.5 Radiation
    - TX06.5.4 Space Weather Prediction